FLOOD INSURANCE STUDY

VILLAGE OF WEST CARTHAGE, NEW YORK
JEFFERSON COUNTY

REVISED
SEPTEMBER 28, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER - 360356

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: January 3, 1986

Flood Insurance Study Revised: September 28, 1990

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FLOOD INSURANCE STUDY
VILLAGE OF WEST CARTHAGE, JEFFERSON COUNTY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Village of West Carthage, Jefferson County, New York. This information will be used by the village to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the original study were performed by the Buffalo District of the U. S. Army Corps of Engineers (COE) during the preparation of the Flood Plain Information report for the Black River from Deferiet Dam to the confluence of the Deer River. The work for that study was completed in November 1977.

In this revision, updated hydrologic and hydraulic analyses for the Black River were conducted by the Buffalo District of the COE for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-88-E-2768, Project Order No. 1. The work for this revision was completed in April 1989.

1.3 Coordination

On January 28, 1985, the results of the original study were reviewed at a final Consultation and Coordination Officer's meeting attended by representatives of FEMA and the Village of West Carthage.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of West Carthage, Jefferson County, New York. The area of study is shown on the Vicinity Map (Figure 1).

In the original study the Black River was studied by detailed methods for its entire length within the community. In this revision, Black River was restudied by detailed methods from the Carthage State Dam to the upstream corporate limits in order to incorporate the results of updated analyses. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Two unnamed streams were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Village of West Carthage.

2.2 Community Description

The Village of West Carthage is located in the southeastern portion of Jefferson County in northern New York, approximately 17 miles east of the City of Watertown and 80 miles north of the City of Syracuse. It is bordered by the Village of Carthage to the north and east, the Town of Denmark to the south, and the Town of Champion to the south and west. West Carthage is only a short distance from Adirondack State Park to the east, the Thousand Islands and the St. Lawrence River to the north and Lake Ontario to the west (Reference 1).

The Black River basin lies in the Lake Ontario drainage basin and drains the western slopes of the Adirondack Plateau. The Black River was named after the color of its water. The river rises in the east-central portion of Herkimer County, flows southwest 20 miles to Forestport, and northwest for approximately 65 miles to West Carthage. The river then flows west through the City of Watertown and enters Black River Bay at the northeastern end of Lake Ontario. The Black River basin has a total drainage area of 1,916 square miles. The upper portion of the basin is rugged and mountainous, contains many lakes, and is in Adirondack State Park. The average topographic elevation of the upper basin is approximately 1,700 feet, with some peaks rising to 3,500 feet. Between Lyons Falls and West Carthage, the river meanders through a broad flat valley, which varies from 0.5 to 2 miles wide and falls approximately 9 feet in 41 miles. This area, commonly referred to as the "Flats", is generally only approximately 2 feet above the low flow elevation of the river. Agricultural flood damage in these flat areas is a frequent occurrence. Between West Carthage and Lake

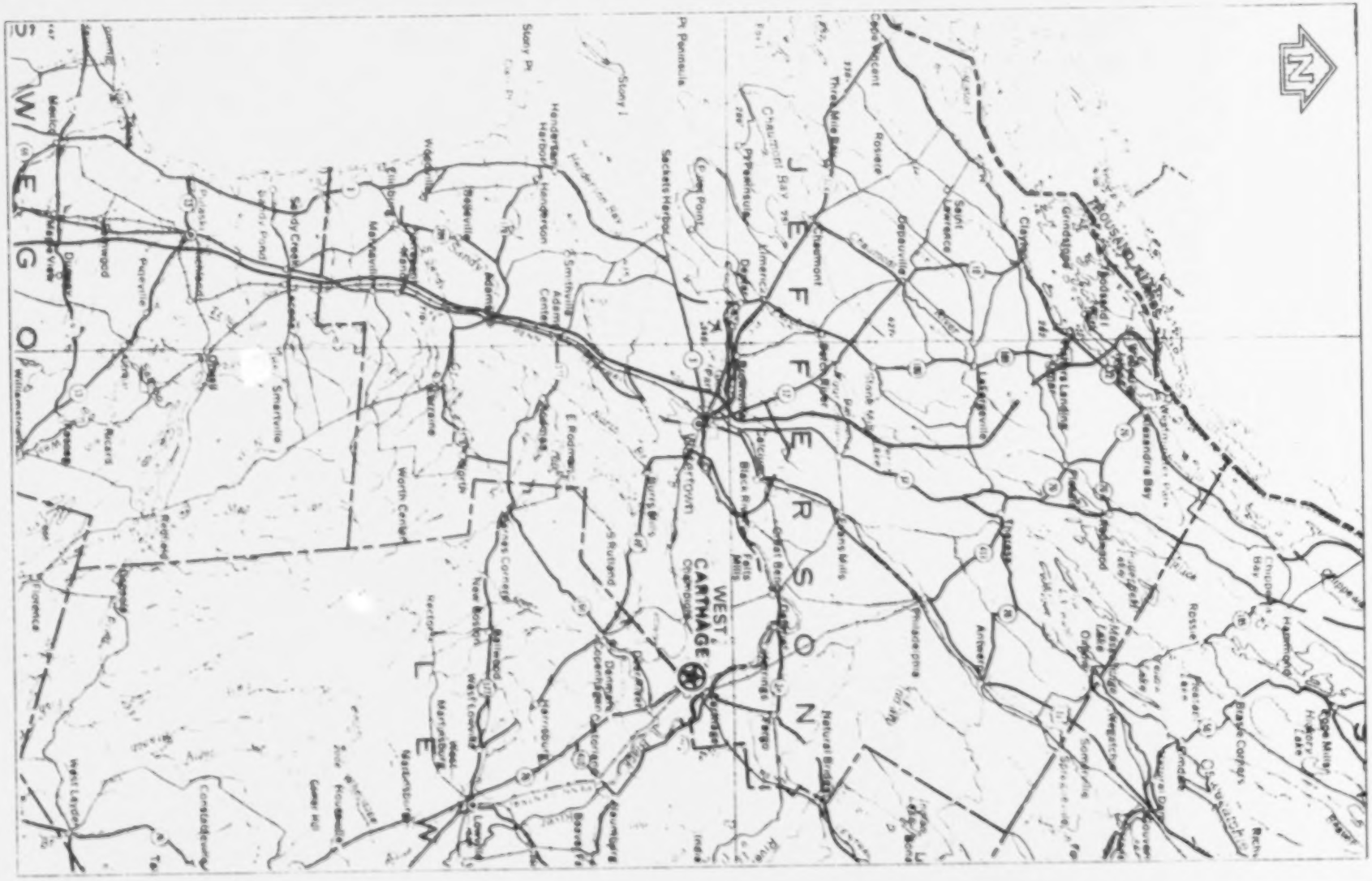


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF WEST CARTHAGE, NY

(JEFFERSON CO.)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

Ontario, the Black River flows through a rocky gorge and falls 480 feet in 30 miles. In this area, rapids are common, and electrical power is developed at several locations. The Moose River, which enters the Black River upstream of Lyons Falls, is the largest tributary. Other tributaries are the Beaver River, Otter Creek, the Independence River, and the Deer River (Reference 1).

The climate of the Black River basin is characterized by long cold winters and short cool summers. The average snowfall in the lower "Flats" area reaches up to 120 inches. In the upper mountainous areas, the average snowfall reaches nearly 200 inches. In the lower main valley, the annual rainfall is approximately 40 inches. The worst storms of the area are those which result from the stalling of a northeast-moving low pressure area, by an encroachment of the sub-permanent North Atlantic high pressure area, and by a mass of cold polar air from the northwest. These storms have a duration of one to six days (Reference 1).

2.3 Principal Flood Problems

Floods occur in the Black River basin almost every year. Spring floods are usually caused by moderate amounts of rainfall and a melting snow cover in the heavily wooded headwater regions. Floods from summer storms occur less frequently. The largest flood of record on the Black River at the Watertown gage occurred on March 15, 1977. The estimated peak discharge was 39,200 cubic feet per second (cfs). The New York State Museum Bulletin reported that heavy floods also occurred on the Black River in 1807, 1833, 1850, 1862, 1866, 1869, and 1896 (Reference 1). The following tabulation lists the ten highest recorded peak discharges, in order of magnitude, on the Black River at Watertown between 1897 and 1974 (Reference 2).

Date	Discharge (cfs)
December 15, 1901	37,000
April 5, 1963	36,700
April 9, 1928	33,900
May 22, 1969	33,600
March 24, 1948	33,400
March 28, 1913	32,500
April 13, 1947	32,200
April 26, 1926	31,900
May 5, 1972	30,900
April 21, 1900	30,200

During floods, ice, trees, brush, and other vegetation in the flood plains impede flood flows, create backwater effects, and increase flood heights. Trees and other debris can be washed away and carried downstream to collect on bridges and other obstructions to flow. This debris plugs the bridge or culvert entrances and retards

flows. These retarded flows produce additional upstream flooding, erode culvert entrances and bridge approach embankments, and damage overlying road beds. When debris breaks loose, the debris and impounded water surge downstream until another obstruction is encountered. This debris can collect against a bridge until the load exceeds its structural capacity, and the bridge is destroyed.

The following U. S. Geological Survey gages are located in the Black River basin in the vicinity of West Carthage:

Station No.	Location	Period of Record through 1977 (years)
04260500	Black River at Watertown approximately 21 miles downstream of West Carthage	57
04252300	Black River near the Village of Boonville approximately 43 miles upstream of West Carthage	66
04258000	Beaver River at the Village of Croghan approximately 16 miles upstream of West Carthage	47
04257000	Beaver River downstream of Stillwater Reservoir Dam approximately 37 miles upstream of West Carthage	69
04256000	Independence River at the community of Donnattsburg approximately 29 miles upstream of West Carthage	35

2.4 Flood Protection Measures

Stillwater Reservoir, which is located approximately 37 miles upstream of West Carthage, was originally formed about 1885 and has been enlarged various times. In 1924, it was enlarged to provide a storage capacity of 106,100 acre-feet between elevation 1,650.3 and 1,679.3. The reservoir is used to regulate flow on the Black and Beaver Rivers for flood control and power development. The drainage area upstream of the reservoir is 172 square miles (Reference 1). There are three dams in West Carthage, but they are not flood control structures.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

In the original study, discharges for the Black River were obtained from the COE Flood Plain Information report on the Black River from Deferiet Dam to the confluence of the Deer River (Reference 1). In that report, the discharges were determined using drainage area-discharge ratios at the Watertown gage.

For this revision, since the drainage area of the Black River at Carthage (1,796 sq. mi.) was within 5 percent of the drainage area of the gage at Watertown (1,864 sq. mi.), the 100-year peak discharge at the gage was used for the portion of the Black River within the village of West Carthage. Also, since there are large reservoirs within the Black River watershed, a basin model designed around the HEC-1 computer program was developed to check the validity of the peak discharge calculated using Bulletin 17B procedures (References 3 and 4).

Bulletin 17B, "Guidelines for Determining Flood Flow Frequency," by the Interagency Advisory Committee on Water Data, was used to determine the 100-year peak discharge at the gage on the Black River at Watertown (Reference 4). The actual computations were performed using the microcomputer version of Hydrologic Engineering Center's Flood Flow Frequency Program (FFFP) (Reference 5). The FFFP uses

the guidelines of Bulletin 17B to calculate discharge-frequency curves. Peak flow data from water year (WY) 1906 through WY 1912, and WY 1917 through WY 1987 were used in the analysis. A generalized skew value of 0.100 was used in the development of the adopted skew, as per the guidelines in the CENCB-ED-W's letter of June 12, 1986 regarding the NCD Consolidated Skew Map. One high outlier was handled using the guidelines of Appendix 6 of Bulletin 17B. The computed 100-year peak discharge at the gage using the Bulletin 17B analysis is 42,800 cfs.

The HEC-1 model developed for the COE's October 1988 reconnaissance report for the Black River basin was adopted as a method of verifying the 100-year peak discharge as calculated by Bulletin 17B procedures (Reference 6). Due to several large reservoirs and the large amount of out-of-bank (valley) storage upstream of Carthage (the Flats), HEC-1 was used to model both the natural and man-made storage that is available in the watershed. The unit hydrograph and loss rate parameters, along with the routing criteria, were mostly taken from the June 1974 report on the Black River Basin (Reference 7). Sear-Brown Associates developed the remaining data not found in the COE report. The 100-year rainfalls (up to 4-day values) were taken from U. S. Department of Commerce technical papers (References 8 and 9). The major reservoirs and out-of-bank storage areas were modeled using Modified Puls routing techniques. All other routing was by Straddle-Stagger Routing techniques. The 100-year discharge calculated by the HEC-1 model was 42,700 cfs. This is only 100 cfs or 0.23 percent less than the Bulletin 17B value. Thus, the 100-year discharge has been verified.

A summary of the drainage area-peak discharge relationships for the stream studied by detailed methods is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BLACK RIVER					
Below Carthage State Dam	1,806	28,800	36,400	39,800	47,900
Above Carthage State Dam	1,796	*	*	42,800	47,900

*Information not available

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

In this revision, cross section data for the backwater analysis were obtained from field surveys and U. S. Geological Survey (USGS) topographic maps. All bridges and culverts were surveyed to obtain elevations and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

For the original study and in this revision, water-surface elevations of floods of the selected recurrence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 10). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

In the original study, starting water-surface elevations for the Black River were determined using known elevations at the Deferiet Dam. In this revision, starting water surface elevation for the Black River at the Carthage State Dam was determined using critical depth. The starting water surface elevations for the tributary channels were determined using normal depth. Tributary 1 was not modeled in this revision because it lies within the 100-year flood plain of the Black River.

In the original study and in this revision, roughness coefficients (Manning's "n") used in the hydraulic computations were estimated by field inspection and engineering judgment. For the Black River, the channel "n" values in the original study ranged from 0.020 to 0.040, and the overbank "n" values ranged from 0.050 to 0.060. In this revision, the channel "n" value for the Black River was 0.035, and the overbank "n" values ranged from 0.060 to 0.070. The channel "n" values for the tributary channels studied in this revision ranged from 0.020 to 0.045 and the overbank "n" values ranged from 0.050 to 0.060. Contraction and expansion coefficients ranged from 0.1 and 0.3 to 0.2 and 0.4, respectively.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 11).

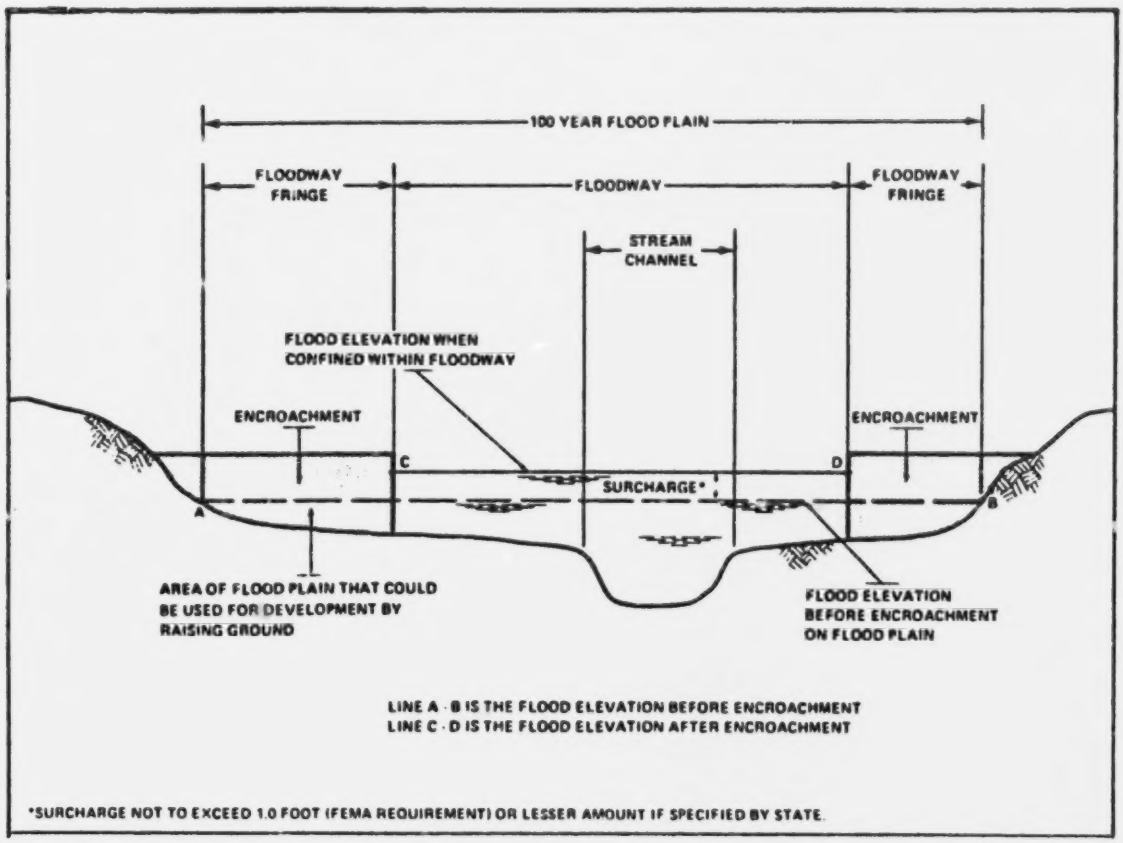
For the streams studied by approximate methods, boundaries of the 100-year floodplain were delineated using the previously printed Flood Insurance Study for the Village of West Carthage (Reference 12).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

In November 1977, the COE completed a Flood Plain Information report for the Black River from the Deferiet Dam to the confluence of the Deer River (Reference 1). The data shown in this study was based on the data in that report.

Flood Insurance Studies have been prepared for the Towns of Champion, Denmark, and Wilna (References 13,14 and 15). The results of this study are in general agreement with the results of those studies.

A Flood Insurance Study is currently being prepared for the Village of Carthage (Reference 16). The results of that study will be in exact agreement with the results of this study.

Because it is based on more up-to-date analyses, this study supersedes the previously printed Flood Insurance Study for the Village of West Carthage (Reference 12).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Army Corps of Engineers, Buffalo District, prepared through the coordination of the New York State Department of Environmental Conservation, Flood Plain Information, Black River, New York, Deferiet Dam to Confluence Deer River, Buffalo, New York, November 1977.

2. U. S. Army Corps of Engineers, Buffalo District, prepared for the New York State Department of Environmental Conservation, Flood Plain Information, Black River, New York, West Carthage State Dam to Mill Creek Near Lowville, Buffalo, New York, November 1974.

3. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-1 Flood Hydrograph Package, Davis, California, October 1970.

4. U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

5. U. S. Army Corps of Engineers, Hydrologic Engineering Center, Flood Flow Frequency Computer Program, June 1985.

6. U. S. Army Corps of Engineers, Reconnaissance Report, Black River Basin, New York, October 1988.

7. U. S. Army Corps of Engineers, Black River Basin, New York, Hydrology and Economic Analysis for Flood Control of Proposed Reservoirs at Hawkinsille, Forestport, and Nelson Lake, June 1974.

8. U. S. Department of Commerce, Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D. C., 1961, Revised 1963.

9. U. S. Department of Commerce, Weather Bureau, Technical Paper No. 49, 2 to 10-Day Precipitation for Return Periods of 2 to 100 years in the Contiguous United States, Washington, D. C.

10. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, August 1976.

11. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: West Carthage, New York, 1943; Copenhagen, New York, 1942.

12. Federal Emergency Management Agency, Flood Insurance Study, Village of West Carthage, Jefferson County, New York, Washington, D. C., January 3, 1986.

13. Federal Emergency Management Agency, Flood Insurance Study, Town of Champion, County, New York, Washington, D. C., July 16, 1982.

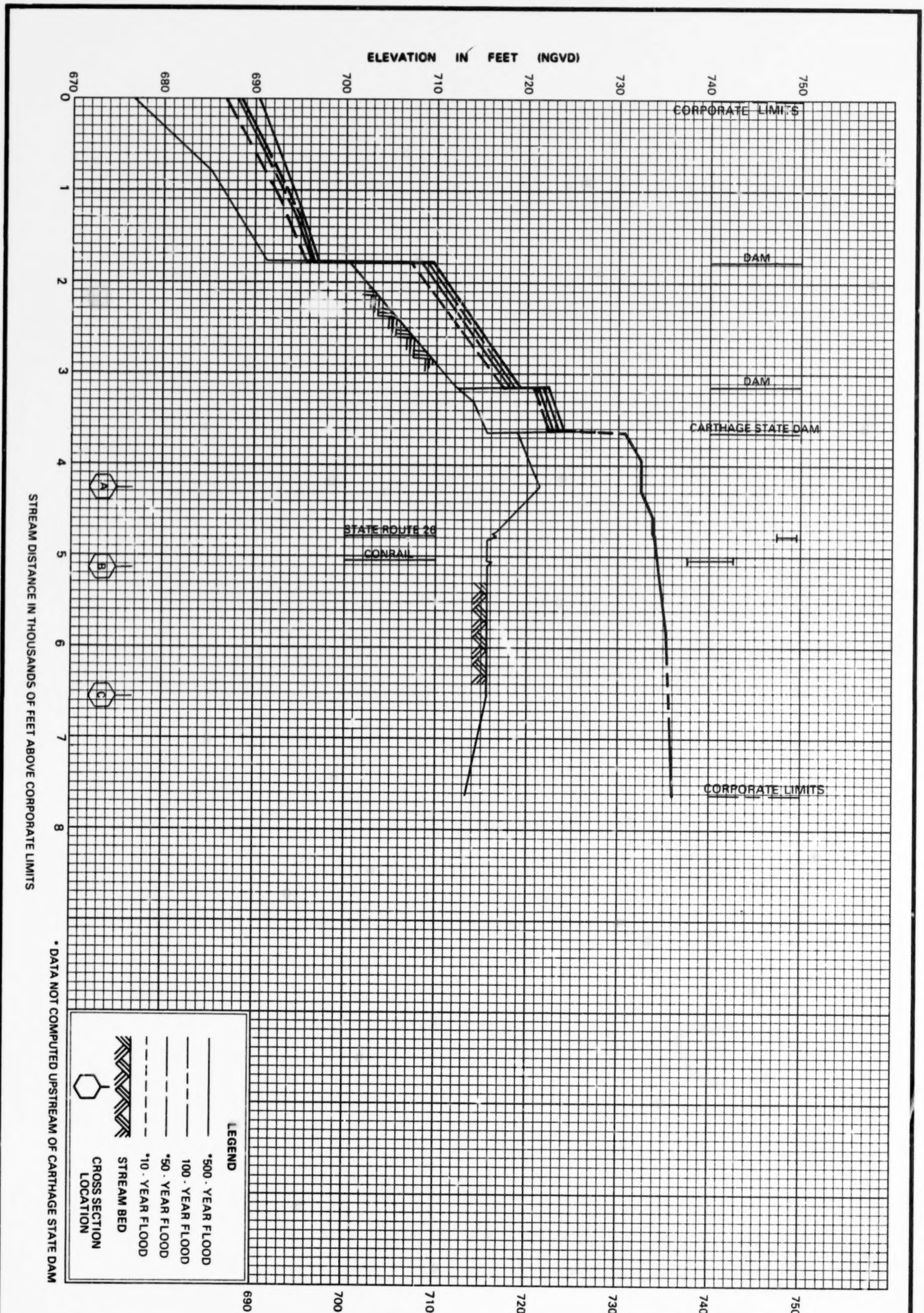
14. Federal Emergency Management Agency, Flood Insurance Study, Town of Denmark, County, New York, Washington, D. C., May 15, 1985.

15. Federal Emergency Management Agency, Flood Insurance Study, Town of Wilna, County, New York, Washington, D. C., May 15, 1985.

16. Federal Emergency Management Agency, Flood Insurance Study, Village of Carthage, Jefferson County, New York (Unpublished).

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (Feet NGVD)	Description of Location
RM 1	741.25	Chiseled square on northeast corner of upstream wing wall at north end of CONRAIL bridge over the Black River.
RM 2	759.24	Chiseled square on southeast corner of upstream wing wall at south end of Bridge Street over the Black River.



FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF WEST CARTHAGE, NY

(JEFFERSON CO.)

FLOOD PROFILES

BLACK RIVER

01P